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Tree fruits for Iowa

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December, 1935

Bulletin 341

TREE FRUITS *for* IOWA

AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS

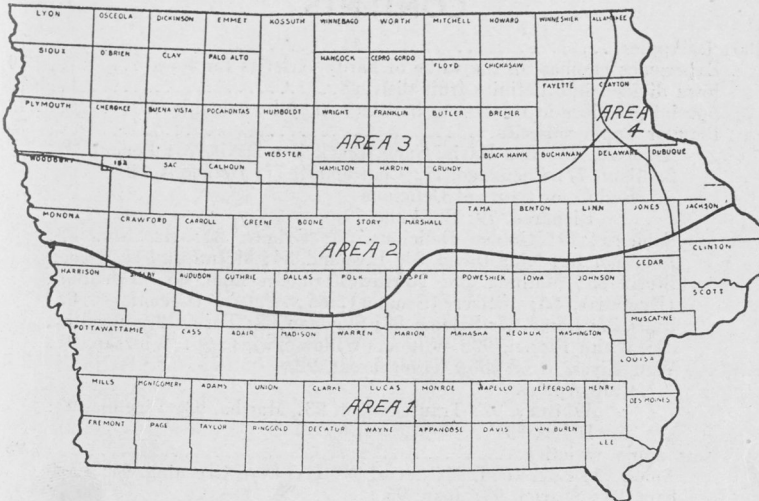
R. E. BUCHANAN, Director

POMOLOGY SUBSECTION

Horticulture Section

AMES, IOWA

IOWA APPLE GROWING REGIONS



Area 1. Jonathan or winter apple belt.

Winter apples of standard commercial quality do well.

Areas 2 and 3. Wealthy belt.

(a) Summer and fall apples do best.

(b) In area 2, winter varieties grown in area 1 may be planted in home orchards, but not commercially.

(c) Only hardiest varieties should be planted in area 3.

Area 4. A few winter varieties of area 1 do well in area 4 on specially selected soils with favored exposures.

APPLE VARIETIES FOR COMMERCIAL PLANTING

SOUTHERN IOWA (Area 1)

Arkansas (Mammoth Black
Twig)
Delicious (Red sports
preferable)
Jonathan
Grimes
Golden Delicious
Northwestern Greening
Oldenburg (Duchess)
Secor (trial)
Turley (trial)
Willow
Winesap

NORTHERN IOWA (Areas 2 and 3)

Brilliant
Haralson
Hawkeye
Malinda
Northwestern Greening
Oldenburg (Duchess)
Salome
Sharon
Wealthy

(Area 4) Winter varieties such
as Jonathan, Delicious and
Grimes. Sharon and Hawk-
eye Greening may be
planted for trial.

See variety discussions

VARIETIES FOR HOME ORCHARD PLANTING

Thirty or forty trees are enough for home orchard. Four trees each of
summer and fall sorts are plenty; the balance should be of winter varieties.
A greater number of varieties are permissible than in commercial plantings.

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Tree Fruits For Iowa¹

By H. L. LANTZ

THIS bulletin is intended to assist Iowa orchardists in the selection of satisfactory tree fruit varieties either for home or commercial production. By consulting the descriptions and discussions herein given and by informing himself as to the present status of varieties already grown in his locality, the prospective planter should be in a position to make a selection which will succeed and bring him satisfactory returns. Doubtless future years will place different valuations upon many of the varieties discussed for Iowa planting.

Many hundreds of fruit varieties have been named and introduced into the trade; comparatively few have stood the test of years and continued trial in any part of this country. Most of them fell short in some vital character, which relegated them to a list of "has-beens." Even old-time apple varieties, like Rambo, Ralls, Sweet Bough and many others, highly favored in the earlier horticulture of the country, have been discarded because they are not as good in a number of respects as some of the newer varieties.

Horticultural progress is linked closely with the origination and introduction of new and better varieties. The fruit grower, however, can well afford to investigate carefully all new varieties until he has seen them given a fair trial in his locality. As a general rule, no new variety should be planted extensively until it has proved its right to a place in the planter's list of commercial sorts. For those who wish to experiment, nothing adds more interest to the orchard than a number of new varieties.

It is not enough to know that soil and climatic conditions are well adapted to growing apples, but it is equally important that such characteristics as disease susceptibility, hardiness, age of bearing, etc. of the various varieties be understood. Particularly is this true of the commercial orchard, where success is so largely dependent upon choosing varieties which are reliably productive and in demand in the general market.

(1) Project 288 of the Iowa Agricultural Experiment Station.

PART I. APPLES

CLIMATIC and soil relations cannot be overlooked in deciding upon the varieties for planting in any section of Iowa. Distribution of rainfall, summer heat and winter cold are limiting factors for certain varieties.

Varieties differ widely in soil and climatic requirements. Such excellent varieties as Esopus and Yellow Newtown are so exacting in these respects that they are planted in but few states and are not satisfactory in Iowa. On the other hand, Jonathan is much less exacting as to soil and climate and is planted in practically every state where apples are grown, making it one of the most widely known apples in America. But even Jonathan and other widely adapted varieties do not succeed equally well in all locations. These examples indicate the value of recognizing the factor of adaptation.

Furthermore, a number of varieties are available which succeed well enough in Iowa in so far as the tree is concerned, but which are inferior in fruit quality. Iowa Blush, for example, is hardy and productive, but is not highly esteemed because the fruit is so distinctly inferior in size and quality. Hibernial is another hardy, vigorous sort, but is of value only where other varieties fail because of lack of hardiness.

EXPERIENCE EMPHASIZES THE VALUE OF HARDY VARIETIES FOR IOWA

Horticultural experience in Iowa dates back nearly 100 years. In 1836, Robert Avery set out an orchard and later developed quite a large nursery in southeastern Iowa. Other nurseries soon came into existence, and trees were planted more and more widely as the land was taken up by the settlers. During these years, practically every known variety and type of fruit were given a hopeful trial. The virgin soil produced wonderful tree growth and promoted early fruiting. Everyone who planted trees was at once greatly encouraged and felt that fruit growing as an industry in Iowa was easily possible. There was no horticultural experience to guide the pioneers. Little did they realize that few of the favorite old New England, New York and old country sorts were adapted to the rigorous climatic conditions which prevailed, particularly in central and northern Iowa. Many thousands of trees were killed outright or severely injured during those



Fig. 1. A test of hardiness in an Iowa orchard. Jonathan trees showing severe winter injury: Northwestern Greening tree at left, uninjured. "Test winters" do much damage to half-hardy varieties, particularly in central and northern Iowa. Hardy stocks prevent much of this kind of winter killing.

severe winters which have been popularly called "test winters." The first recorded "test winter" in Iowa, which did extensive damage, occurred in 1856. "Test winters" have occurred with more or less regularity since that time and can be expected to occur again. Past experience clearly indicates the folly of planting, for any purpose, those varieties which have proved over and over again their inability to withstand test winters. Baldwin, Esopus, Yellow Newtown and many others have repeatedly failed in Iowa. Other varieties, such as Northern Spy, even though the trees may thrive, have been generally unproductive in most localities because of tenderness of fruit bud or other factors not well understood.

In northern Iowa, except in a very few specially selected locations, Jonathan, Delicious, Golden Delicious, Stayman and others of like hardiness should not be planted because they are not hardy enough, and sooner or later are nearly always winterkilled. It can be stated with absolute certainty that any variety to be successfully grown in Iowa, must have "hardiness," which is the ability of a plant to endure its environment with little or no injury to either top or root.

IOWA DIVIDED INTO DEFINITE FRUIT DISTRICTS

It became apparent as early as 1860 that Iowa was divided into two horticultural sections—southern and northern—because of climatic and soil conditions. For general purposes, a line can be extended across the state, passing a little north of Des Moines and turning upward as the Mississippi and Missouri rivers are approached. South of this line a number of winter apples of standard quality can be grown profitably, both in the home and commercial orchard. North of this line, in a general way, only the hardiest varieties are reliably productive. Unfortunately, these are nearly all summer and fall sorts, with the addition of a few winter varieties which are not of standard market quality and style.

During the last 10 years hardy new fruits have been originated and found valuable for planting in central and northern Iowa. Varieties originated by the Iowa Agricultural Experiment Station suitable for planting in this area are Sharon, Hawkeye Greening and Earlham. Haralson, originated at the Fruit Breeding Farm, University of Minnesota, is also new and has been found to be satisfactorily hardy and productive.

Southern Iowa is in the northern limits of the winter apple belt. For this section such varieties as Jonathan, Grimes, Delicious, Ben Davis, Gano, Willow Twig and Rome Beauty are successfully grown. These commercial sorts reach a high state of perfection and compare favorably with the same varieties as grown in other regions.

New apples which may be planted for extensive trial in southern Iowa are Secor and Edgewood; these originated at the Iowa station. Others worthy of trial planting are listed on pages 94, 95. The Turley, to replace Stayman, originated in Indiana and is an apple worthy of trial in home and commercial orchards.

Northern Iowa is in the southern limits of the Wealthy belt (so-called because Wealthy is the most successful and widely known variety of the region). Together with Wealthy are Oldenburg, Yellow Transparent, Patten Greening, Northwestern Greening, Brilliant, Malinda and Salome. These are the varieties which must be largely depended upon for general planting.

Southern Iowa, Missouri and the Mississippi Loess soils which cover southern Iowa are, in general, the soil types which promote good tree growth and production. The likelihood of winter injury becomes much less a factor than is the case on the heavier soils which prevail

in northern Iowa. Perhaps no better apple tree soil in the world can be found than the Missouri Loess in southwestern Iowa. North of Monona and Crawford counties, winter temperatures tend to limit the favorable possibilities for successful fruit growing, even though the same soil type extends northward. On the east, the Mississippi Loess soil is also well adapted to fruit growing.

Westward from the Mississippi River, the Mississippi Loess soils extend irregularly through Cedar, Johnson, Iowa, Poweshiek and Jasper counties. If favorable exposures and soils are selected, this section appears to be moderately well adapted to fruit growing. The best standard varieties grown in southern Iowa can be grown. North of this tier of counties, tender varieties should be planted sparingly and only for home orchard purposes. Their chance for success diminishes rapidly as they are planted farther northward.

For a considerable distance northward along the bluffs of the Mississippi River, specially selected, warm exposures are being utilized by a number of commercial orchardists, who have been unusually successful in growing such varieties as Jonathan and Delicious even as far north as LaCrescent, Minn.

It must be remembered that those orchards which are successful in these northern latitudes have been located with judicious care in relation to exposure, soil, air drainage and other factors. The same latitudes on the prairies are not at all adapted to any but the hardiest varieties. Such special sites are often profitable financially because of an excellent local demand for winter apples of high quality.

SPECIAL PRACTICES IN RELATION TO HARDINESS MAY BE VALUABLE

Certain practices may be employed to advantage in growing half-hardy but otherwise desirable varieties some distance north of where they are naturally adapted. The most commonly accepted practice is to top-graft Jonathan, Delicious, Grimes and others which are more or less liable to winter injury on hardy varieties. Good results in preventing some of the most severe forms of winter injury on trunk and crotches are thus obtained in central and northern Iowa. Even in southern Iowa, the use of Virginia Crab and Hiberna as stocks is recognized as a valuable practice.

Jonathan, Grimes and Delicious when top-worked on these hardy stocks grow rapidly, bear early and have proved to be more productive and longer lived than when grown on their own stems.

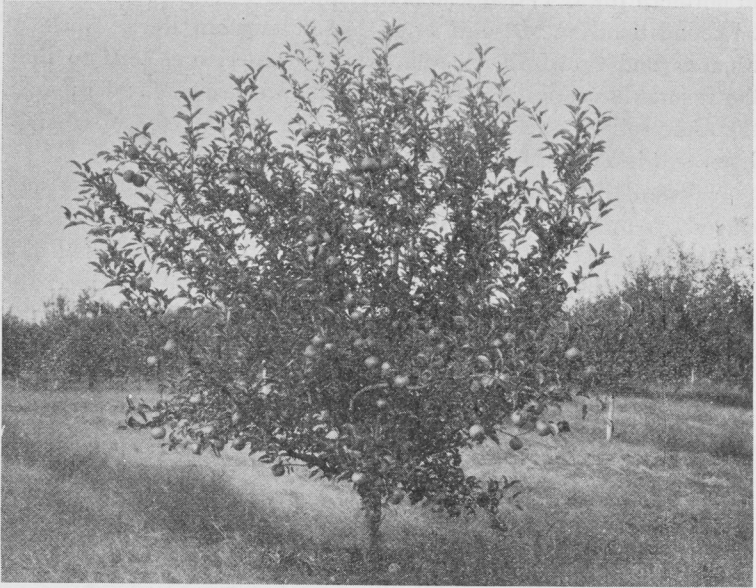


Fig. 2. Varieties of the apple—including Duchess, Jonathan, Grimes, Starking—when planted on suitable soils in Iowa produce fruit in 5 or 6 years if given good culture.

The Virginia Crab and Hiberna stocks have been more widely used in Iowa than others. The varieties, Hass, Shields and Izo Crab and others have been used in a limited way in the north and have given satisfactory results.

Other special practices which are beneficial are the use of manure, either barnyard or green, to provide at all times a generous supply of organic matter to the soil. This assists very materially in making the soil more moisture retentive. This, in turn, reduces certain types of winter injury and promotes vigorous, healthy growth which aids in the prevention of such diseases as blister canker and collar rot. Winter root injury may be largely prevented by providing either natural or artificial soil mulches before winter weather begins. Suitable mulches can be obtained by growing crops of buckwheat, rye or by allowing weed growth during the late summer and fall, or by adding straw or manure as a top dressing. At Ames, oats sown the latter part of July have produced very satisfactory cover protection. Oats are usually cheap, make a rank growth until frozen, hold the snow, prevent soil erosion, and do not need to be controlled by cultivation the following spring.

DISCUSSION OF APPLE VARIETIES

The descriptions of the apple varieties listed herein are general and give practical information in regard to the peculiarities, faults and good features of each of the varieties discussed. Only the more important and valuable kinds are listed. Some of these are not recommended for planting, but attention is given them because they have been planted more or less generally and are still available from nurseries. Perhaps other varieties should have been included. Revisions will need to be made later as new and better varieties are introduced and found adapted to Iowa.

In writing the following descriptions and discussions, the most authoritative sources of information were drawn upon, including the experience of practical growers and the records of the annual transactions of the Iowa Horticultural Society.

A few explanations regarding flavor and quality ratings will assist in clarifying what is meant by such terms as "good quality," "sprightly sub-acid," etc. Pomologists, in describing apples, have called attention to certain characters of flesh which can be compared. For instance, a variety may be coarse grained, as is Ben Davis, or fine grained, as is Grimes. Other variations may be intermediate, or even outside these texture ratings and be rated as very coarse grained, or perhaps medium coarse, if neither coarse nor distinctly fine. The flesh may be very juicy, or it may be distinctly lacking in juice, or fall in between these two extremes. The flavor may vary from sweet to sour with several grades of acid. Jonathan is rated as sprightly sub-acid; Ben Davis is mild sub-acid; Tolman is sweet, with no perceptible acid in the flavor.

Flavors are composed of degrees of acid, together with other factors, such as the amount of intermingled sugar and aromas. Taken together, texture, juice, amount and type of acid, with the intermingled flavors, constitute what is generally called quality. Quality ratings run through poor, fair, good, very good and best, with good as a center point. Ben Davis is often rated as good quality. Varieties superior to Ben Davis, are rated very good or best. Varieties inferior to Ben Davis, naturally, are classed as poor or fair.

POPULAR APPLE VARIETIES

Arkansas (Mammoth Black Twig)

Healthy, vigorous and of good habit in the orchard, but in Iowa Arkansas has the general reputation of being an alternate year cropper

and sometimes a shy bearer. Fruit is susceptible to scab and often scalds seriously in storage. Can be planted in southern Iowa in a limited commercial way to supply local trade, but should not be planted north of Des Moines. Its reputation as a shy cropper is so well known that seldom is Arkansas included in the commercial planting lists in Iowa.

Fruit usually of large size; largely overspread with a dull, deep red color on a dull green under-color; firm, crisp, juicy flesh of sprightly sub-acid flavor; quality, good; season, February to May.

Ben Davis, Gano and Black Ben Davis

These are discussed together because they are so similar in tree and in soil and climatic adaptations, differing mainly in color. Ben Davis and its kin have been losing favor for the last 2 decades. Because of its adaptability, attractive red color, excellent shipping and storage qualities, and because the tree is an early and productive bearer, it has proved profitable; but like most other varieties of its group Ben Davis is better adapted to those regions where there is a long growing season. In central and northern Iowa, it becomes smaller in size, more irregular in form, less highly colored, and inferior in quality.

In the old orchards of Iowa, Ben Davis was one of the leading varieties, having been planted liberally as far north as Ames and along the bluffs of the Missouri River as far north as Sioux City. From Des Moines southward it is one of the most productive commercial varieties. The stand of trees, however, in many orchards has been greatly reduced, because of drought, winter injury and heavy production, which rendered the tree susceptible to the attacks of blister canker. This disease has been particularly destructive on Ben Davis in nearly every part of Iowa.

As other varieties of much superior quality have come into prominence, the difficulty of disposing of Ben Davis is increasing yearly—particularly, when there is a large apple crop.

Varieties of the Ben Davis group average above medium size. Ben Davis is attractively colored with stripings and splashing of brilliant carmine over greenish yellow, while Gano and Black Davis are almost solidly covered with deep red. Gano has a brighter tone of color than Black Ben Davis. The flesh is white tinged with yellow; firm, coarse grained, tender, lacks juice, mild sub-acid in flavor; fair quality; season December to May.

Benoni

Among August apples in southern Iowa, Benoni has no rival in color or in quality. Unfortunately the fruit is too small to meet market demands. The tree bears young; is an alternate year cropper and, except under favorable conditions, has the reputation of being only a fair to good bearer; hardy in southern Iowa, and is a desirable home orchard sort.

Fruit, small to below medium in size; roundish, inclined to conic in form; orange yellow, overlaid with attractive pinkish red, mottled and striped with carmine; flesh, yellow, tender, crisp, juicy with mild rich sub-acid flavor; quality very good, season mid August. Best dessert apple of its season.

Brilliant

Originated as an open pollinated seedling of Fameuse by the late C. G. Patten of Charles City, Iowa. In northern Iowa Brilliant is larger and deeper red than its parent, Fameuse, and is good in quality, Resembles Fameuse in flesh characters with the exception of being a little more mild in flavor. Brilliant bears at an early age, is very productive, bearing good crops annually or nearly so. Tree does not attain large size, is stocky, vigorous and produces many short, thick-set spurs.

Fruit is medium to above medium size; uniform; deep self-colored red, attractive; flesh, tender, fine grained, moderately juicy, mild sub-acid, quality good; season October to January if grown in northern Iowa; grown at Ames, it becomes a September apple. Suited for home orchards throughout most of northern Iowa and for limited commercial planting where there is a good local trade.

Chenango

In the home orchard and for local markets, Chenango is a useful apple in the southern half of Iowa. The attractively colored fruit and its good quality make it popular. The trees bear early, produce crops almost annually, generally with alternate heavy and light crops. The fruit ripens unevenly and is ready to pick from Aug. 15 to Sept. 1 in Iowa. The flesh is too tender to permit much handling and on that account does not ship well.

Fruit, medium to above medium size, oblong conic in shape, attractively colored with pinkish red, overlaid with striping and mottling of carmine; flesh, white, tender, juicy, mild sub-acid, aromatic and of very good quality. Season mid-August to mid-September.

Charlamoff

Exceeded by few varieties as to hardiness. Of Russian origin; a vigorous, strong grower; biennial cropper, bearing abundantly during the "on year." Fruit ripens unevenly, drops very freely and must be disposed of quickly when ripe; a good apple for dessert when at its best.

Fruit, of good size, rather irregular in form, splashed and washed with lively crimson over pale yellow; flesh, very tender, juicy, mild sub-acid; good quality; season, mid-August in northern Iowa. Of value for home orchard collection.

Delicious

Originated in Madison county, Iowa, and disseminated in 1895 under the name of Delicious. Because of excellent quality, large size and attractive color, it was very soon accepted, both by consumers and growers. Planted with success over a wide area and more or less extensively in Iowa, particularly in southern Iowa. The trees, under the systems of orchard management which often prevail in Iowa, have made satisfactory growth, but the consensus is that it comes into bearing rather tardily as compared with Jonathan; has shown some tendency to tenderness in fruit bud and has been only moderately productive.

With judicious cultivation, some Iowa growers have been able to obtain early fruiting and satisfactory crops. Delicious under Iowa conditions requires a cultural practice which conserves moisture and makes available a large amount of plant food in the soil. Permanent sod evidently must give way to other types of cultural practices if best results are to be obtained. Iowa grown Delicious are of good size, excellent quality and fine color, and there is a ready market for all that are grown.

As a companion variety for Jonathan, perhaps Delicious is equal to any other for planting in Iowa where Jonathan does well, provided proper culture is given. Commercial plantings should be confined to southern Iowa for safety of investment. Delicious is a good orchard tree when properly trained, being vigorous and moderately hardy. The fruit is susceptible to apple scab which can be controlled by proper spraying.

Delicious is a very popular variety and assists in building up a strong local demand for other varieties where fruit is sold at the orchard during harvest time. Iowa-grown Delicious keeps well in

cellar storage until December or January and in cold storage until April or later.

Fruit, large, attractive, lively red-striped, very tender flesh, mild rich sub-acid, aromatic; quality very good to best for dessert, and an excellent market sort.

Red Color Sports of Delicious

Delicious is one of the leading varieties planted commercially in Iowa during the last 10 years, and attention is directed to its red color sports. It is possible that these sports will thrive as well under Iowa conditions as does Delicious. Richared and Starking are the most widely known of the Delicious sports, but more than 50 red sports of Delicious have been found; a number of them have been named.

Richared

Richared originated in Washington in a block of 450 trees of Delicious. In this instance the whole tree sported to the red type. It is described as a full red Delicious type, and is said to be identical with Delicious in tree and in size, form and quality of fruit. The full red color develops 2-3 weeks in advance of color development on Delicious. This is an evident asset.

Starking

Starking is a red bud sport of Delicious. The fruit develops full red color early in the season, and can be picked early enough to prevent overmaturity on the tree and subsequent mealy breakdown. Starking, according to authentic reports, differs from Delicious only in color. Heretofore no recorded evidence indicates that the tree characters have been changed, while the fruit is of the same size, shape, flavor and season as Delicious. Starking trees now 6-8 years of age, according to the observations made at Ames and by fruit growers in Iowa, are somewhat different, however, in growth habit when compared with Delicious. The branches form wider angles, are more strongly attached and less subject to sharp, weak crotches, than is the Delicious tree. Of particular interest is the observation of orchardists that Starking bears fruit 2-3 years before Delicious. This has also been the experience with Starking in the Iowa Agricultural Experiment Station orchards at Ames. Whether Starking is hardier than Delicious remains to be seen. Under Iowa conditions Delicious trees often "go to pieces" rapidly after the tenth or twelfth year because of winter injury, sharp crotches and improper training. If bud



Fig. 3. Jonathan, Grimes and other quality apples do well in southern Iowa.

sports like Starking and Richared continue as above indicated there is much to be gained by planting these sports rather than the old type of Delicious.

Fameuse

Some of the largest and oldest trees found in Iowa which have survived the many test winters are of this variety. For the home orchard it has retained its popularity, but for commercial planting it demands expert handling to grow it free of scab, to bring it to good market size, and then to harvest it successfully. Commercially it is better adapted to portions of New England and Canada than to Iowa. For the home orchard in central and northern Iowa, Fameuse is one of the best of its season.

Tree is hardy, healthy, productive, long lived, upright, roundish-spreading habit, becoming dense if not pruned properly. Fruit is attractive, bright red, striped with deeper tones of red. The flesh is moderately firm, very tender, fine grained, crisp and juicy, aromatic; very good quality for dessert. Season, October to December, or later in cold storage.

Golden Delicious

This is a new yellow apple of considerable promise. Yellow apples have been generally less popular than red varieties. Grimes Golden

does well in southern Iowa but has a number of serious defects, both in tree and in fruit. A good, yellow apple with wide adaptation has long been sought to supplant Grimes. Golden Delicious has been introduced recently as such an apple. It originated as a chance seedling in West Virginia.

Golden Delicious has been planted rather widely in Iowa during the last 10-15 years and with varying results in all areas. Whether the tree will be long lived remains to be determined. It has repeatedly suffered winter injury in central and northern Iowa but in southern Iowa is making a favorable record for production and also as a market apple. Curiously enough, commercial growers in various sections of southern and south central Iowa, after 10-15 years of experience with it, do not yet agree as to its value for extended commercial planting. Some growers see in it a new apple of much promise. Golden Delicious usually finishes with desirable size, but during some seasons under Iowa conditions its appearance and keeping quality are marred by the development of numerous large, irregularly shaped lenticels (dots). It is also susceptible to spray injury. It has proved to be an excellent variety in cold storage, but in cellar storage may shrivel badly. The fruit should be allowed to remain on the tree as late in the season as possible to insure full maturity. The tree is a well-formed, vigorous grower, at least on certain soils, and bears unusually young. The fruit is large on young trees; a beautiful, clear-skinned yellow; firm, crisp, juicy; mild sub-acid flavor; aromatic; very good quality. It has a late season, is worthy of planting in nearly every home orchard, particularly in southern Iowa, and for commercial plantings deserves careful consideration in localities where it has been found satisfactorily hardy and productive, and where the fruit finishes properly.

Grimes

Grimes is the most popular yellow apple in Iowa. It is an old, well known sort, of high quality for dessert and for culinary uses. The tree is regularly productive and does well wherever Jonathan thrives, although perhaps a little less hardy than Jonathan, shorter lived, and often disastrously susceptible to collar rot after the tree reaches bearing age. In Iowa and Illinois blister canker has wrought havoc with Grimes trees which have been weakened by overproduction and winter injury. Losses from collar rot on Grimes can be eliminated by use of hardy stock. Virginia Crab and Hibernial have proved to

be well adapted as stocks for Grimes, producing trees which are longer lived and even more productive than trees grown in the ordinary way. Nurserymen have recognized the value of hardy resistant stock for Grimes, and double-worked trees are sometimes available.

Grimes often runs a little small in size, particularly on old trees. It is subject to storage scald and internal breakdown which often cause considerable commercial loss. Commercially, Grimes is in strong demand where yellow apples are in favor; for many years it has been a close rival of Jonathan for profit among Iowa growers. It has lost some prestige because of the growing demand for red apples and because of defects in tree and fruit. Grimes is still, however, a profitable variety, throughout southern Iowa. It is a general favorite for the home orchard but cannot be planted with much certainty of success north of Des Moines, except in specially selected sites where soil is friable, warm and well drained.

Fruit, medium size; clear, attractive, yellow; very tender, fine grained, juicy flesh, mild rich sub-acid; ranks very good to best in quality; late fall and early winter.

Haralson

This new apple was originated by the University of Minnesota Fruit Breeding Farm and introduced in 1923. Nurserymen are propagating it; trees are being planted extensively as far north as southern Manitoba. It has an unusual record for hardiness, and the tree is vigorous and productive. The fruit is medium to above medium in size, of good full red color, and keeps until spring. The flesh is white, firm, moderately tender, juicy, mild sub-acid, quality good. Season January to April.

Jonathan

Jonathan is the most popular apple grown in Iowa. Its handsome red color, high quality both in and out of cold storage and the comparatively wide adaptation of the tree have made it one of the most cosmopolitan varieties. The quality of Iowa-grown Jonathan is so well known that it is its own sales agent.

For southern Iowa, no variety is better adapted to commercial culture than Jonathan; does particularly well on well drained, deep friable soils, such as the well known Missouri, Mississippi and southern Iowa loess soils.

The tree is productive and satisfactorily hardy and long lived for commercial planting in southern Iowa. It is subject to winter injury

if the cultural practice employed does not provide a soil mulch. Fire blight in all its forms is occasionally serious where high cultural conditions promote succulent growth. Jonathan is, however, nearly free from blister canker and collar rot. Both the tree and fruit are severely attacked by cedar-apple rust. Suitable steps have been taken in western Iowa to eradicate the red cedar trees which are a necessary alternate host for the disease. Fruit is quite easily kept clean of scab and apple blotch. In storage it is subject to "Jonathan spot," internal breakdown and soft scald, but these troubles may be effectively controlled by storing the fruit without delay after picking; the fruit should be held in storage at 35° F.

But notwithstanding its defects, Jonathan is one of the most profitable varieties now grown in southern Iowa. Iowa-grown Jonathan when well finished, carefully handled, and stored at proper temperatures can be held in cold storage until Jonathan from other sections are off the market.

For the home orchard, and in specially selected and adaptable sites, Jonathan can be recommended for central Iowa, and northward along the bluffs of the Missouri and Mississippi rivers where warm exposures and friable soils are available. In the prairie regions of central Iowa and northward, Jonathan becomes less and less satisfactory, suffering severely at times from winter injury; by using hardy stocks some forms of winter injury may be avoided, but even so Jonathan cannot be recommended for commercial planting in this region.

Fruit is of medium size, smooth and symmetrical; bright deep red or carmine extending over most of the surface. Flesh, firm, crisp, very juicy, sprightly rich sub-acid, quality very good to best; season, late fall and winter.

King David

Does well wherever Jonathan is successful. The tree is vigorous, healthy and productive; blooms late and often escapes frosts which seriously reduce the crops of many other varieties; hardier than Jonathan in tree.

At its best it is nearly equal to Jonathan in quality, but for storage is not so satisfactory and should be used by Christmas. Subject to water core and may become mealy and dry in storage. Satisfactory for home orchard planting and, to a limited extent, may be planted

commercially as a companion variety to Jonathan because of its ability to set crops when Jonathan may fail because of frost.

The fruit is medium in size, decidedly attractive in color, solid deep red or carmine extending over the entire surface. It averages a little smaller in size than Jonathan which it resembles in form, though somewhat more inclined to be conic. Flesh, very tender, juicy when prime, sprightly sub-acid with a rich aroma; quality very good; season, October to December.

Liveland

An old-time sort. Hardy in northern Iowa, but generally unproductive, though vigorous, healthy and long lived. Fruit of good size, oblate, with a whitish skin overspread with an attractive pinkish mottled red. Flesh, very tender, juicy, sprightly aromatic, quality very good; season, August. Fruit ripens unevenly and drops badly.

McIntosh

Popular where well adapted because of its fine red color and high quality, but not satisfactory in most sections of Iowa because it is slower to come into bearing and is a more uncertain cropper than in many other sections where it is better adapted. While the tree is moderately hardy, even in northern Iowa, the summer heat is too intense to bring the fruit to satisfactory maturity. The fruit is apt to run irregular in size, ripen unevenly and drop freely several weeks before ready for harvest. In a season which is rather cool, accompanied by well distributed rainfall, McIntosh matures a crop of fruit which is of good size and excellent color. McIntosh is fairly well adapted to northeastern Iowa.

Fruit, medium or above in size, smooth and symmetrical; color nearly solid bright red over most of surface; flesh moderately firm, white, very tender, fine grained, very juicy, spicy, aromatic, very good quality; season, late fall to mid-winter.

Maiden Blush

This attractive old-time variety is still popular as a late summer apple for home use and for local markets in Iowa. The tree is hardy as far north as Ames, is a good grower, and produces at an early age. The fruit scabs rather badly, drops easily, does not handle well, and does not stand up long after harvest unless placed in storage promptly after picking.

Fruit, medium to above medium in size, oblate; attractively colored,

pale yellow with a contrasting blush of bright crimson; flesh, tender, pale yellow, moderately juicy, sprightly sub-acid in flavor, quality good. Season early September, keeps in storage until November or December if stored promptly after harvest.

Malinda

One of the hardiest winter apples grown in Iowa. Old trees attain large size and show little or no winter injury of consequence. Very productive; fruit, often small in size. Mainly of value for the home orchard in north central and northern Iowa; not good enough in quality to compete with standard varieties on the general markets of the country, but should be included in the home orchard where other winter varieties are not satisfactory.

Fruit, medium size when well grown; clear golden yellow in color, with a bright pinkish blush. Flesh firm, coarse grained, moderately tough, lacks juice, mild, nearly sweet; fair quality; season, late winter.

Northwestern Greening

Once liberally planted throughout the Middlewest and often a "money-maker" because of its generous production, but like Ben Davis it lacks high quality and does not meet competition well when there is a large crop of high quality apples to be marketed. It has found favor with hotel and restaurant trade because of its excellent baking and culinary qualities. Recommended for planting commercially throughout southern and central Iowa but in less numbers than Jonathan, Grimes, Delicious or Willow and perhaps some other varieties, depending largely upon the particular locality. For northern Iowa it is well adapted to home orchard collections but should only be planted commercially where favorable exposures and warm, friable soil types are available. On flat, heavy soil, it is apt to be a shy cropper.

The tree is hardy in central and southern Iowa and in favorable locations in northern Iowa, vigorous, regularly productive if given proper culture; subject to limb breakage, susceptible to blister canker. The fruit often lacks uniform size, and if not well grown is poor in quality. When carefully harvested it is a good storage apple. Soft-scald or internal browning of the fruit is sometimes serious in storage. In southern Iowa, the fruit must be sprayed thoroughly for the control of apple blotch.

Fruit, large, greenish yellow or yellow; firm, coarse grained, moderately juicy, mild sub-acid; good quality; season, late fall and winter.

Oldenburg

(Duchess)

A pioneer among Russian varieties; and the outstanding variety of its season as a commercial and home orchard sort. Tree does not attain large size and needs little pruning when in full bearing; tends to overload in alternate years, hardy in any part of Iowa. Commercially planted to some extent in southern, central and northern Iowa. Southern Iowa Oldenburg is usually ready for market early in August. The season runs progressively later northward, and at Charles City, Oldenburg is ready for market from Aug. 20 to 25.

Oldenburg is difficult to handle commercially; it drops badly, ripens quickly on the tree, does not stand heat well and goes down rapidly after being picked. If it can be packed and promptly placed in iced refrigerator cars it reaches market satisfactorily; otherwise, there is apt to be loss due to over-ripeness and to scald.

It is an open question whether Oldenburg should be planted in Iowa at this time except for home use. Due to excessive plantings in other sections, prospective growers should consider carefully future market conditions before planting more Oldenburg than can be sold locally.

Fruit, medium size; attractively red-striped; tender, juicy flesh; a little too acid for dessert. As a culinary sort, it is very popular in its season.

Oliver

(Senator)

Primarily adapted to south Central and southern Iowa; keeps well into the winter; but little better in quality than Ben Davis. Tree bears quite early, is nearly equal to Jonathan in hardiness and is productive. Fruit hangs well till mature; is medium to large in size; deep red; flesh firm, medium to fine grain, crisp, moderately juicy, mild sub-acid, becoming very mild as it ripens; quality, good; season, mid-winter or later.

Patten

(Greening)

A valuable fall apple where climatic and soil conditions are not suited to growing the better quality sorts. For the home orchard on the open prairies of northern Iowa, Patten Greening will succeed

where most other varieties fail. Few varieties equal it in hardiness. Tree is strong growing, healthy, spreading and productive, but often comes into bearing rather tardily, depending on soil and exposure.

Fruit, large; a clear pale green, often faintly but attractively blushed; flesh, tender, coarse grained, sub-acid, fair quality; season, September, later in season when grown in more northern latitudes; a good culinary sort but difficult to dispose of in commercial quantities when the crop of other varieties is ample for market demands.

Ralls

An old-time favorite which is giving way to larger, more stylish apples of its season. Hardy in southern Iowa and does rather well as far north as Ames. Primarily adapted to home orchard as it lacks sufficient size and color for commercial planting and requires too much effort in thinning, pruning and fertilization to obtain fruit of good marketable size and color. Fruit, generally small; green or dull greenish yellow with more or less dull red striping, not attractive. Flesh, firm, moderately fine, moderately tender, somewhat crisp, juicy, agreeably sub-acid, aromatic, good to very good quality. Season, late winter and spring; often shrivels in cellar storage.

Rome

Apparently rather well adapted to the friable, warm and retentive soils of southern Iowa. Tree is productive, moderately hardy, comes into bearing fairly early, is a late blooming variety, but requires a long growing season for best development and is therefore not well adapted to central or northern Iowa. It has done sufficiently well in a number of southern Iowa orchards to suggest that it has commercial possibilities in that section. The fruit and foliage are particularly susceptible to scab. It is well and favorably known on the market. Several important red color sports of Rome are worthy of trial planting in Iowa. These are known under several names, as Gallia Beauty and Red Rome. These sports are being planted extensively in the Rome Beauty areas of other states.

Fruit, large when well grown; attractively striped and mottled with bright red; firm, rather coarse grained, moderately juicy, becoming dry and mealy when over-mature, mild sub-acid, ranking in quality with Willow; prime in January and February or later in good storage; in demand on the market because of its excellent size, good color and late keeping qualities. As a baked apple Rome has few rivals. The restaurant trade uses Rome extensively.

Salome

Above average in hardiness, usually productive on typical apple soils and perhaps one of the most popular winter apples grown in northern Iowa, but lacks sufficient style and quality to make it profitable except for local markets. The crop often lacks uniformity in size and much of it may be unattractive in appearance because of poor color. The fruit shrivels badly in cellar storage, but keeps fairly well in cold storage until May or later. The tree is an early regular producer, becomes dense with age, and needs pruning to keep the tree open and to stimulate color. Salome is found growing well on a wide range of soils, but succeeds best on the lighter types. It can be grown to the northern boundary line of Iowa, but is not so well adapted at that latitude as farther south. Salome can be planted safely in the home orchard and is recommended for central and northern Iowa where other winter sorts fail because of lack of hardiness.

Fruit, of medium size, striped and mottled with pinkish red or carmine, color extends over most of the surface; somewhat coarse, crisp, juicy, sprightly sub-acid, good in quality; season, winter.

Stayman

An important variety in some of the leading apple growing sections of the United States. It has been recommended and extensively tested in southern Iowa as far north as Des Moines. Those who have grown it recommend it with reservations. The tree is not equal to Jonathan in hardiness in Iowa and, even in southern Iowa, may suffer extreme winter injury before reaching bearing age. The fruit often fails to develop good red color, and in most Iowa locations is subject to cracking around the stem. Growers are not all agreed as to its commercial value, but the general opinion is that Stayman is too tender for Iowa orchards. A tree or two for the home orchard in southern Iowa would not be amiss.

Fruit (when well finished), medium to large; attractive though rather dull red with varying shades or obscure striping. Flesh, fine grained, juicy and tender, sprightly sub-acid, and ranks good to very good in quality; season, winter to late winter.

Turley²

As an apple to take the place of Stayman, Turley is attracting favorable attention in the commercial apple growing sections of the

(2) Oskamp, J.—The Indiana Horticultural Society's Experimental Orchard. Circ. No. 74. Ind. Agr. Exp. Sta. 1917.

Middlewest. Turley is a variety of the Stayman type, free of Stayman's most serious defects, such as lack of color and stem end cracking. It was originated as a seedling of Winesap by Joe A. Burton while he was superintendent of the experimental orchard of the Indiana Horticultural Society. Commercial plantings of Turley in southern Indiana are rather extensive, and the results have induced considerable enthusiasm for this new variety. The tree is vigorous and productive, is an open grower and has good foliage. Only recently has it been planted in Iowa, and as yet no records are available as to its hardiness. Observers believe that the tree is stronger and equal if not superior in hardiness to Stayman.

The fruit ranks large in size and resembles Stayman in form. The color is attractive solid deep red or nearly so. The flesh is yellowish, firm, crisp, tender, juicy, mild pleasant sub-acid and rates very good in quality; season, winter. The flesh characters and the flavor are similar to Stayman.

Wealthy

The most popular variety of its season now grown in Iowa. Widely disseminated throughout the leading apple growing regions of the United States and Canada; in some northern sections the most important commercial variety of the region. It ripens in August and September, depending largely upon latitude and altitude and if properly handled is a good storage variety with commercial limits extending to Christmas.

It is best adapted for commercial purposes to central and northern Iowa. Its commercial season in southern Iowa begins two weeks in advance of northern Iowa, but southern-grown Wealthy cannot be stored as safely as the northern-grown, as the fruit lacks firmness and good color. Before making extensive plantings of Wealthy or other varieties of its season, consider carefully the commercial production of other regions which have already planted heavily to this variety.

Wealthy comes into bearing rather early; bears abundantly, often overloads, producing undersized and undercolored fruit. This may be corrected by proper pruning, thinning and by paying particular attention to maintaining soil fertility. The fruit ripens unevenly and often drops freely. It is necessary to make several pickings to save the entire crop and market uniformly well finished fruit.

Tree, above average in hardiness, does well in all parts of Iowa;

subject to crotch and trunk injury during severe winters. Also subject to fire blight in all its forms, often suffering severely in seasons when succulent growth is induced by an unusually rainy season. In spite of these defects in fruit and tree, Wealthy is a good apple in its season for both the home orchard and for commercial purposes.

Fruit, medium to large; a beautiful red color when well grown. Flesh is agreeably tender, very juicy; sprightly and refreshing; good to very good quality; normal season, September, but keeps for several months longer if carefully harvested and placed in cold storage immediately.

White Pippin

Similar in many respects to the famous Yellow Newtown, but the tree is hardier under Iowa conditions. Grows well on most of the soil types in southern and central Iowa and is quite productive. In certain localities in northern Iowa, it also has done well. White Pippin has not been planted extensively, but where it has been tried, it has given satisfactory results. The variety should be given a trial in every home orchard where the soil is at least reasonably well drained. White Pippin deserves more attention in Iowa because of its late season.

Fruit, medium to above in size; a good clear greenish-yellow color; firm, crisp, juicy, sprightly sub-acid flesh; quality very good; season, mid-winter to late winter.

Willow

(Willow Twig)

Pretty generally known in the Middlewest for nearly 50 years; rather extensively grown in Illinois and Iowa, and generally productive, producing fruit of large size which handles well for commercial purposes. The fruit, while not highly attractive, brings good prices in the spring after most other varieties have gone, and has yielded a profit where many other varieties have failed to do so earlier in the season. In cold storage it is one of the best keepers and is almost entirely free of storage troubles. The tree is as hardy as Jonathan, makes a poor nursery tree, but becomes very large as it attains age; few varieties are more productive in the Middlewest. For commercial purposes, Willow is best adapted to southern Iowa and generally produces well where the soils are deep, rich, friable and well drained. It is of value for the home orchard in central and southern Iowa.

Fruit, when well grown, moderately attractive in color, more or less blushed and mottled with red and irregularly striped and splashed with deeper red. Flesh, firm, coarse, moderately tender, juicy, sprightly sub-acid; quality good.

Winesap

Not so well adapted to commercial culture in Iowa as a number of other varieties. Tree is perhaps half hardy, or less, comes into bearing tardily unless given intensive cultivation. When of full bearing age, is productive to a fault, which often results in a high percentage of small fruit. Fruit should be thinned on the trees, as is done on the west coast, to produce standard commercial size. It should be planted only on friable, rich, well drained, warm soils. Must be thoroughly sprayed for the control of scab. For the home orchard, one or two trees are generally acceptable and can be planted safely wherever Jonathan does well.

Fruit, attractive deep red, with very firm flesh and stands well as a commercial storage variety, keeping well into March and April; of good to very good quality and destined to be valuable and popular sort for many years.

Wolf River

One of the varieties of Russian type which originated in Wisconsin and one of the largest apples of its season. Popular for local trade because of its large size and good culinary quality. Often brings good prices, merely because of its good size, but cannot be relied upon to do so when there is a large crop of higher quality apples available. Tree, hardy and vigorous, wide spreading, often subject to fire blight, moderately productive in southern Iowa, but sometimes a shy bearer in northern Iowa. Fruit tends to drop freely, often ripens unevenly, and has only a short season of usefulness. Codling moth is especially bad in fruit of Wolf River.

Fruit, large to very large; fairly attractive, clear pale yellow or greenish, mottled and blushed with bright deep red; flesh rather coarse, juicy, tender, sub-acid, fair to good quality; season, September, later if kept in cold storage.

Yellow Transparent

Of particular value for the home orchard and may be grown for local markets in a limited way to meet the demands for summer apples. Hardy in nearly all parts of Iowa, but not equal to Duchess in this respect. The tree is of upright habit, slow growing after reach-



Fig. 4. Well cared for apple orchards are productive in Iowa. An orchard scene near Council Bluffs, Iowa.

ing bearing age, subject to blight, often a biennial bearer, frequently overproductive, producing small unmarketable fruits unless the fruit is thinned.

Fruit, clear pale yellow; flesh very tender, juicy, fine grained, sprightly sub-acid, good quality, ripens unevenly from late July through August, depending upon latitude. Fruit is easily bruised, does not remain in good condition very long and must be consumed promptly when ripe. A desirable sort for the home orchard and often profitable in a small way on local markets.

Crab Apples

Whitney

A well known sort; hardy in any part of Iowa. Tree upright in habit; productive; fruit of good size; bright red, striped; very tender, juicy flesh, sprightly sub-acid, aromatic and very good to best quality; season, August and September. A leading crab for any home orchard and often valuable for local markets.

Transcendent

An old sort, hardy in central and southern Iowa, and moderately hardy in northern Iowa. Very subject to blight. Of medium size; greenish or yellow with reddish blush and stripe; firm fleshed, juicy,

sprightly sub-acid; excellent for jelly. Season, late August to mid-September.

Martha

Originated by Peter M. Gideon, Excelsior, Minn. Fruit, large; bright, attractive red over pale yellow; flesh of excellent flavor and quality; season, September, October or later.

Virginia

A large free growing tree, and because of its hardiness and resistance to blight it is one of the best crabs for planting in Iowa. The fruit is above medium in size; firm fleshed and good quality.

Dolgo

A new handsome, intensely bright red fruited Siberian crab. Introduced by the South Dakota Experiment Station. The tree comes into bearing early, is very productive and remarkably ornamental, both in tree and the fruit. An excellent jelly crab.

NEW APPLE VARIETIES

Fruit growing in America has made its most important advances through the origination and introduction of new and better varieties. Productive varieties of better size, quality and of attractive color have appeared from time to time so that there has been a constant shifting of our variety lists. Fruit growers everywhere are still looking for better varieties. Iowa needs hardier red winter apples and varieties which are less susceptible to disease. Jonathan, Grimes and Delicious are the most important varieties in the commercial plantings of southern Iowa, but there is great need of later maturing sorts of better quality to supplement these.

During the last 25 years many new fruit varieties have been originated and introduced. Some have already proved valuable either locally or nationally. Many will fail altogether. Only by extended trial is it possible to determine the value of any fruit. Local tests should indicate the value of any new variety pretty conclusively before large plantings are made.

The need for hardier red winter apples of better quality in northern Iowa is widely recognized. Of recent years new winter apples have been originated and introduced. Some of these have shown hardiness and can be recommended for trial. The most prominent of these are Sharon, Hawkeye Greening, Earlham and Haralson, all of which have satisfactorily gone through preliminary trial.

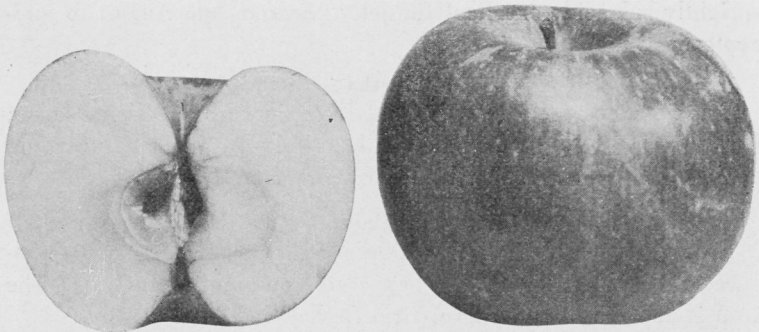


Fig. 5. Secor—A new apple of very good quality; keeps late and is recommended for trial wherever Jonathan does well.

New apple varieties originated by the Iowa Agricultural Experiment Station are briefly described below. Full discussion and description will appear in another bulletin now in preparation.

Ames

Dark red, firm fleshed, good quality, keeps until April. Southern Iowa.

Edgewood

Productive, larger than Jonathan, medium red, firm, crisp, juicy, sprightly sub-acid, very good. Excellent storage apple, free from Jonathan spot, keeps until June. Valuable only if top-worked on hardy stock like Virginia Crab.

Secor

Productive, larger than Jonathan, medium red, firm, crisp, rich, sprightly flavor, quality equals Jonathan and keeps 2 months longer. Free of Jonathan spot; central and southern Iowa.

Hawkeye Greening

Hardy, annually productive, large green apple. October to March; one of the best apples for culinary use. Central and northern Iowa.

Earlham

Very hardy, large yellow apple, firm, mild flavor, April, May. Central Iowa and northward.

Sharon

Hardy, productive, medium size, tender, juicy, mild, aromatic,

sub-acid. Very good. November to January. Very good storage apple. One of the best for central and northern Iowa.

Joan

Large, showy red apple of medium quality. Produces good crops each year. November to January. Central and northern Iowa. Very promising.

Trees of Secor, Sharon, Joan and Hawkeye Greening apples, the Polly peach and the Patten pear are being propagated by Iowa nurseries. New varieties from other sources and those originating at the various state experiment stations are also beginning to be propagated by a number of mid-western nurseries, so that trees are available to those who wish to plant them.

McIntosh Seedlings

(New varieties originated by the New York Agricultural Experiment Station, Geneva, N. Y.)

Early McIntosh

Resembles McIntosh in color and flesh; summer.

Lodi

Resembles Yellow Transparent but is larger; summer.

Milton

Attractive pinkish red, with McIntosh flesh; late summer.

Cortland

Best known of this group; red, good quality; winter.

Macoun

Deep red, flesh like McIntosh; late winter.

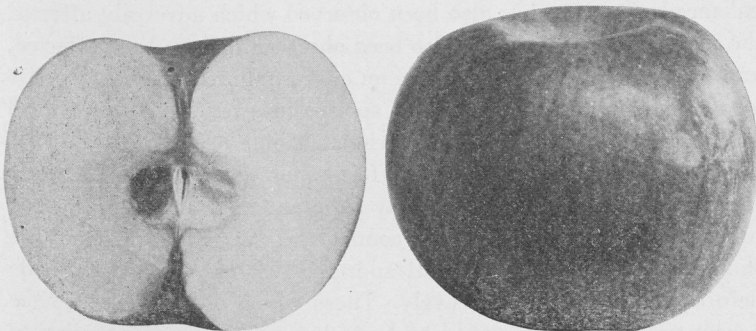


Fig. 6. Sharon—This new apple has excellent dessert quality. One of the best new varieties for central and northern Iowa.

Kendall

Dark red, firm fleshed; late winter.

Delicious Seedlings

(Introduced by New York Agricultural Experiment Station.)

Medina

Delicious type, but larger; winter.

Newfane

Dark red, large size; midwinter.

Orleans

Delicious type, but larger; winter.

Melba

A McIntosh seedling originated by the Dominion Experimental Farms, Ottawa, Canada, is a hardy, summer apple of very good quality. Fruit medium size, striped with red, tender, juicy, very good; ripe at Ames about mid-August.

RED COLOR SPORTS IN APPLES

Red color sports in apples have been observed from time to time but have not attracted very much attention among orchardists until recently. The value of good red color as an asset in the market is recognized everywhere; consequently, new varieties of superior red color which have developed as sports of the leading commercial varieties are commanding wide attention.

Apple varieties are very stable, and only rarely do they change in any way, yet some of the most important commercial apples have produced red color sports in which the color values are more or less enhanced. Sporting has also been observed which adversely affected the color. Vigor of tree has also been observed to have been affected, and when affected, it has been in an adverse direction—i. e. there is a loss of tree vigor. A number of sports, however, have been named and are now recognized as new varieties. Some of these color sports will doubtless have far reaching effects upon the future of the apple growing industry and in time may supplant their less well colored parents and become leading commercial varieties. Orchardists should investigate carefully all sports which are offered for sale before planting them extensively. Those which do not revert to the parent type and prove stable, and which prove upon propagation to be productive and show no changes which adversely affect size of

fruit, flavor, hardness or productiveness of the tree, may be planted instead of their less well colored parents.

Red color sports have the advantage of developing their red color several weeks ahead of the parent variety which permits picking when the fruit is in the best stage of maturity for storage.

The red sports which have the most commercial value in Iowa are those of Delicious, Jonathan and Willow. The Rome sports are also of interest inasmuch as Rome usually does not develop satisfactory red color; but in other respects it is fairly well adapted to southern Iowa.

The following is a list of the important commercial varieties which have produced color sports:

Variety	Red Sport ³
Baldwin	Black Baldwin
Delicious	Richared
Delicious	Starking
Duchess	Red Duchess
Gravenstein	Banks
Gravenstein	Red Gravenstein
Jonathan	Blackjon
McIntosh	Red McIntosh
McIntosh	Black-Mack
Northern Spy	Red Spy
Rambo	Red Rambo
Rome	Gallia Beauty
Rome	Red Rome
Spitzenberg	Red Spitzenberg
Stark	Red Stark
Stayman	Blaxtayman
Stayman	Staymared
Twenty Ounce	Collamer
Twenty Ounce	Hitchings
Willow	Red Willow
Winesap	Seeando Winesap

(3) Only the most commonly propagated red sports are listed here. Some varieties have given rise to as many as 50 recorded sports.

PART II. PEARS

NO pear variety of good standard quality has proved satisfactorily hardy, productive and blight-resistant in Iowa. As a result, there are few commercial pear orchards in the state, and even pear trees are not common. A few varieties have shown, however, a good degree of hardiness and resistance to pear blight. These can be grown reasonably well in southern Iowa if proper attention is given to pear blight control and if well drained soils are selected for the orchard location. Only the hardiest sorts can be grown at all in northern Iowa. These varieties are more or less inferior in quality but nevertheless are satisfactory for home orchard planting and for local markets.

Below is a list of varieties with brief descriptions. This is a list of those perhaps best suited for Iowa. Several pear varieties should be planted together to insure fertilization of the blossoms.

OLD VARIETIES

Anjou

A standard market pear for fall and early winter. It has few equals when well grown—either in appearance or quality of fruit. Yellow, marked with russet; juicy; very tender; spicy, rich flavor. The tree is vigorous, relatively hardy and relatively free of blight, but not always a good cropper. Should be planted only in southern Iowa.

Flemish Beauty

Moderately hardy in tree, productive, but very susceptible to scab and to pear blight. The fruit is of excellent quality, of September or October season. A pear for those who wish to obtain choice quality fruits at the extra care and trouble necessary to combat scab and blight.

Kieffer

Kieffer is moderately hardy in southern Iowa, less troubled by blight than most other sorts, and may be quite productive if given some attention. Kieffer, while widely grown, is low in dessert quality. When the fruit is picked in a hard, ripe condition and allowed to come to full ripeness under a storage temperature of about 60° F. it is a satisfactory variety for culinary and canning purposes. Well grown, Kieffer is attractive, greenish-yellow, with dull red or bronze cheek; flesh coarse, crisp, juicy, sub-acid; quality, fair; season, September

and October. Kieffer succeeds and produces well in southern and south central Iowa.

Seckel

Fairly hardy in central and southern Iowa. One of the highest in quality of all pears, but lacking in good size. What it lacks in size, it makes up in quality. The tree is vigorous, productive, moderately hardy and more highly resistant to blight than are many other sorts. It is smooth and well formed; reddish brown in color; with melting, buttery, juicy, richly flavored flesh of excellent quality; season, October.

Valuable for home orchard collections in southern Iowa.

Lincoln

A large fruited variety of hardy constitution. Has been reported as doing well as far north as Waverly, Iowa. Moderately resistant to blight, and probably one of the best pears for the Mississippi Valley because of its ability to stand extremes of cold and heat.

The fruit is medium or above in size; yellow; firm, rather coarse, granular flesh; tender, very juicy, aromatic; pleasing, but not highly flavored; quality good.

Valuable for trial in home orchard collections in central and northern Iowa.

Winter Nelis

One of the standard winter varieties, ranking very high in dessert quality, but not particularly attractive in color. When top-worked on hardy pear stock it is hardy and productive as far north as Charles City, but when on its own stem, Winter Nelis can be planted with safety only in southern or central Iowa. The tree is a scraggly, crooked branched grower, productive to a fault, often requiring thinning to bring the fruit up to standard size. The fruit is medium in size; well formed; russet, with delightfully tender, juicy, melting flesh; sweet and highly flavored; quality, very good to best.

A good variety to plant with other sorts for those wishing to try a few pears in the home orchard.

Longworth

A native of Iowa, originated at Dubuque some years ago by the late N. K. Fluke. Its chief value lies in its extreme hardiness and blight resistance. The fruit is coarse grained and poor in quality, but will grow in those locations where other varieties are not suf-

ficiently hardy. The fruit is of medium size; greenish or yellowish as it ripens; coarse in texture, sub-acid, moderately juicy; quality, poor; season, September, October.

NEW PEAR VARIETIES

Four new pear varieties are now available to those who wish to experiment. These are Beierschmitt, Mendel, Parker (Minn. No. 1) and Patten. Except Beierschmitt these varieties have qualities of tree and fruit which commend them for extended trial plantings throughout the Upper Mississippi Valley, where most standard varieties cannot be grown with certainty.

Only general statements concerning these pears are warranted until further experiment demonstrates their respective values.

Beierschmitt⁴

This new pear deserves special mention because of its excellent size and quality. It originated on the farm of J. A. Beierschmitt near Fairbank, Iowa, about 1900, from seed of Bartlett planted by Marie Beierschmitt, the mother of Mr. Beierschmitt. The original tree bore at 7 years of age. The excellent quality of the fruit was noted and led to an effort to produce more trees by digging roots for transplanting, which finally resulted in the death of the original tree. Propagated trees—now about 15 years old—have been healthy, productive and fully as hardy as Kieffer growing in the same orchard.

Young trees of Beierschmitt have not stood the winters well in northern Iowa. This variety seems to be somewhat hardier than Bartlett, but it is not sufficiently hardy to recommend for trial except in southern Iowa. The fruit is above medium to large in size; resembles Bartlett in form except that it is broader and not so distinctly necked. Color, greenish yellow, becoming clear pale yellow when ripe, often flecked with thin pale russet. Skin, very thin and tender; flesh, firm, very tender, very juicy, aromatic, very mildly sub-acid; quality, very good to best and superior to Bartlett. Season, Sept. 15-25.

Mendel

This pear originated at New Ulm, Minn. It is reported to be hardy and productive. The fruit is medium to above in size, pyriform shape; color, dull, deep green and russeted, turning yellow as it ripens; flesh, tender, smooth, medium grain, juicy, sprightly sub-

(4) Trans. Iowa Hort. Soc., Vol. 62, p. 102, 1927.

acid, agreeable pear flavor; quality, good; season, late September and October.

Parker (Minn. No. 1)⁵

This pear originated at the University Fruit Breeding Farm, Excelsior, Minn., from seed obtained from Manchuria. It is regarded as hardy as far north as the Twin Cities and is reported to be only partially resistant to fire blight. The tree is above medium in size, free growing, and probably hardy in all parts of Iowa.

The fruit is medium to large, roundish pyriform in form; color is yellow and distinctly blushed; flesh, tender, medium fine grained; juicy, sweet, pleasant flavor; quality, very good; season, September.

Patten (Orel 15 x Anjou)

Since its introduction by the Iowa Agricultural Experiment Station in 1922, the Patten pear has proved to be the hardiest of all the large fruited pears. It has a record of withstanding temperatures

of 35-40 degrees F. below zero without injury to the tree or fruit buds. The tree is a free grower, distinctly upright in growth habit until it comes into full bearing, has an abundance of good healthy foliage,

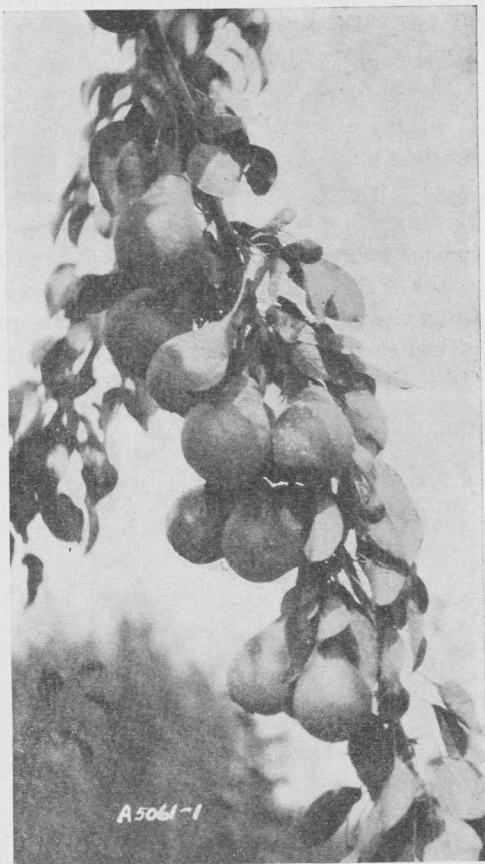


Fig. 7. The Patten pear is the hardiest of the large fruited pears. It is productive, of very good quality, and will thrive in all parts of Iowa.

(5) W. H. Alderman—New fruits produced at the University of Minnesota Fruit Breeding Farm. Bul. 230, Minn. Agr. Exp. Sta. 1926.

but is not entirely blight resistant, although with reasonable precautions it can be grown successfully. The Patten has been favorably reported upon in both Dakotas, Minnesota and in Canada. It is well adapted to planting in any part of Iowa and will produce fruit in most years. It blooms a little past mid-season. The blossoms are large, handsome, white, with a double corolla (10 petals) instead of the usual single corolla (5 petals).

The fruit when well grown is medium to large size, favors Bartlett in general form, smooth and regular; color, green, turning yellow as it ripens, often with bronze blush on exposed side. The skin is medium thick, but becomes thin and tender as it ripens. The flesh is very tender, very juicy, sprightly rich sub-acid, refreshing and very good in quality; flesh may become somewhat gritty if permitted to hang on the tree too long; season, September.

The fruit of Patten must be picked while still firm and green. Otherwise it develops grit cells and rots quickly as it ripens. When picked early (late August or early September) and stored at about 60° F., it ripens well and develops very good quality.

PART III. PEACHES

PEACH growing in Iowa is almost exclusively a home orchard proposition restricted pretty largely to southern Iowa. In locations favored by soil conditions and site, peach growing has been carried on in a small commercial way.

Although there is little choice in respect to the hardiness of varieties, special attention is called to a new seedling variety, the Polly, originated by the Iowa Agricultural Experiment Station.

POLLY

This variety as grown in southwestern and southeastern Iowa has borne fruit following winter temperatures of 20-25 degrees below zero. The tree is very vigorous, upright spreading. Fruit large, roundish. Skin creamy white, overspread with a fine red blush. Flesh tender, juicy and of the finest quality. Free stone. Unexcelled for dessert or culinary use. Ripens Aug. 25-30. The variety is worthy of planting throughout southern Iowa on account of its record for hardiness.

CHAMPION

This is one of the old reliable standard varieties. The tree is hardier and more vigorous than any of the common good varieties. The fruit has white flesh and is of excellent quality.

Elberta, Hale, Crosby, Triumph, Bokara and Greensboro are found in home orchards throughout southern Iowa.

Special attention is called to some promising new varieties which are being planted rather extensively in peach growing regions. The Oriole, Golden Jubilee, Halehaven, Vedette, Valiant, Hal-Berta Giant and Candoka are worthy of testing in Iowa. Trees of these new varieties are now being propagated and sold by a number of leading nurseries.

PART IV. PLUMS

THE native American plum varieties, *Prunus americana*, thrive on a wide range of soil types, provided drainage is reasonably good. Many varieties of this group are hardy and productive in all parts of Iowa. They are, in general, much less subject to brown rot than are either the pure Japanese, *Prunus salicina*, or the Japanese hybrid varieties, but nevertheless require spraying. The pure americana varieties are rapidly disappearing and are being replaced by the larger fruited and firmer fleshed hybrid varieties. Many of the hybrids mature more evenly on the tree and are larger in size, but have the disadvantage of being quite susceptible to brown rot. It is very essential that a spray program be followed very closely in growing plums.

The pure Japanese varieties, *P. salicina* (*triflora*), are only moderately hardy in southern Iowa or in south central Iowa, but the Japanese hybrid varieties are generally hardy throughout the state. These hybrid plums, many of which have equal mixtures of American and Japanese blood, often partake of the hardiness of the American plum, but some of them bloom early and rot badly. The new plums are in general hardier and can be grown further north than can any of the pure Japanese varieties.

The European sweet plums, *P. domestica*, with few exceptions, are not reliably hardy in any part of Iowa. In southern Iowa on well drained rich soils Lombard and occasionally Green Gage are found doing fairly well if planted on carefully selected sites.

Selection of varieties is largely a local problem and should be based not only upon local soil and climatic conditions, but also whether the planting is made to supply home or market demands. Consumers in general demand large fruited varieties.

The Japanese Hybrid plums are not only self-sterile, but are cross-sterile as well. It has been found that certain American varieties will pollinize the hybrids and are necessary in order to obtain good sets of fruit. Experiments in Minnesota prove that Surprise, a native American plum, and the Kaga plum, a *Prunus simoni* hybrid, are good pollinizers for nearly all of the hybrid varieties. In Iowa, Terry has been found to be satisfactory. DeSoto, Wyant and Wolf are also believed to be satisfactory as pollinizers. Even though only a few trees of the hybrid plums are planted it is highly important that some of

the above americana varieties be planted at the same time. The proportion of 1 tree in 9 is recommended for general planting.

The following list of plum varieties is suggested for Iowa planting. Only brief notes are given for each variety. Plums vary greatly in size and quality as grown on different soils under varying systems of culture. Also, the plum variety situation has shifted so rapidly that it is difficult to give exact information regarding many of the newer varieties as compared with the older sorts. Much testing of varieties in Iowa is still needed to determine what varieties have a place in the commercial lists, but in home orchards a wide selection of varieties can be planted with confidence, and they add much interest to the orchard.

OLD VARIETIES

Burbank (*salicina*) [*triflora*]

No hardier than Abundance, but fruit of better size and quality. It is often found doing well in southern Iowa; blooms early along with most other Japanese varieties; subject to brown rot. Large of size; attractive, dark red over yellow; flesh, deep yellow, firm, tender, sweet; cling stone; quality, good.

De Soto (*americana*)

One of the hardiest of the americana species; productive; fruit of medium size; red and yellow; flesh yellowish, cling stone; mid-season.

Miner (*hortulana*)

An old standard variety; hardy; moderately productive; fruit bright red; roundish; firm, juicy, good quality, late season.

Omaha (*americana* x *salicina*)

Hardy in central or southern Iowa and in special sites in northern Iowa; of large size, light red and good quality.

Terry (*americana*)

Very large when well grown; ripens along with Stoddard; roundish; bright pale red over yellow; firm fleshed, a little fibrous, tender, sweet; good to very good quality; hardy; one of the best of the native americana plum varieties.

Wild Goose (*hortulana*)

Ripens in early August; an old and well known sort; hardy in central and southern Iowa; medium size, clear red, fair quality.

Wyant (*americana*)

An old standard variety; season, September; fruit oblong; deep red color; flesh moderately juicy, sweet; fair quality.

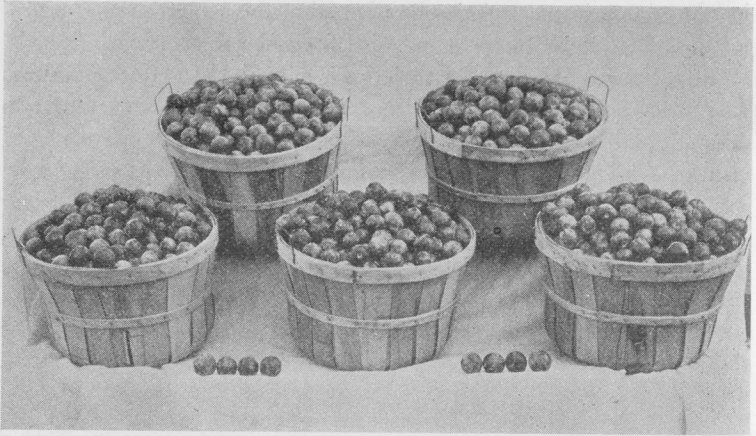


Fig. 8. There is a ready market for large fruited plums. Patten is one of the best americana varieties. (Half-bushel baskets.)

Patten (*americana x hortulana*)

Originated by C. G. Patten, Charles City, Iowa, and introduced for trial in 1918 as Patten 1301 by the Iowa Agricultural Experiment Station. Named and introduced by the station in 1923 under the name of Patten.

The original tree is still productive, and in good condition at the State Fruit Breeding Farm, Charles City, Iowa.

The tree is vigorous; wide spreading in habit, with healthy bright but dark green foliage; not subject to shot hole fungus; blooming season, 5-7 days later than most of the pure americana varieties and thus escapes an occasional late frost. It should be planted along with other late blooming varieties to insure cross fertilization.

The fruit is large to very large; roundish, somewhat flattened at the ends; suture line indistinct; color, medium red, with lilac bloom over yellowish ground color; flesh, very firm, meaty, juicy, a little fibrous, sprightly sub-acid, becoming sweet as it ripens. Quality very good; season, mid-September, as grown at Charles City. The fruit, unlike most of the American plums, does not run to small sizes as the trees become old. Fruit is almost free from brown rot.

The Patten plum is certainly hardy in northern Iowa, and equal to, if not superior, in size, color and quality, to any of the pure American varieties. Worthy of trial in any part of Iowa.

NEW HYBRIDS PRODUCED BY UNIVERSITY OF MINNESOTA FRUIT BREEDING FARM⁶

The Minnesota varieties are available from nearly all nurserymen of the Upper Mississippi Valley. The varieties described here have been planted by various growers in Iowa and have gained favor because of the large size and fine appearance of the fruits. These varieties are hardy in most locations, but may not be equally well adapted to all conditions. Further trials are needed to demonstrate those best adapted for planting in the various sections of Iowa. These varieties are susceptible to brown rot and need careful spraying.

In Minnesota the new plum varieties have been placed in two lists, the best varieties being Underwood, Tonka, Red Wing, Monitor, Superior and Elliot. The second list includes Hennepin, Radisson and LaCrescent.

Elliot

A large high quality late plum of pleasant flavor. It stands up well after harvest and is regarded as a good commercial variety. Tree, hardy, moderately vigorous, drooping and regularly productive. Fruit, large, nearly round, red; flesh, yellow, firm, tender and juicy; stone nearly free; good quality; late season. Productive in Iowa.

Hennepin

A red fleshed plum especially recommended for canning. Tree, medium size, hardy, and productive; fruit, medium size, dark red with heavy bloom; flesh dark red, slightly stringy; quality, fair to good; early season.

LaCrescent

Very attractive, yellow early plum of high quality. It has the fault of being a shy bearer, but is hardy. Tree, very vigorous; fruit, medium size, yellow; flesh, yellow, juicy, very tender, melting, sweet; quality, very good.

Monitor

A hardy, vigorous and productive tree. Fruit very large; dull bronze red color; flesh, yellow, tender, very juicy, firm, sweet but acid around pit. Ripe in late August when grown at Des Moines. Productive and worth planting in Iowa.

Radisson

A large showy red plum of very good quality, which ripens evenly on the tree and is well adapted for market purposes. The tree is a

(6) W. H. Alderman, New fruits produced at the University of Minnesota Fruit Breeding Farm, Bul. 230, Minn. Agr. Exp. Sta. 1926.

medium grower; fruit, large, roundish, red with blue bloom; flesh, firm, yellow, tender, juicy, sweet; quality, very good; season, early.

Superior

Recently introduced and named and reported to be the largest and best of the plums originated by the Minnesota station. The tree is hardy and very productive. It has not been generally tested in Iowa, but several amateur growers have reported that Superior is living up to its reputation.

Red Wing

A hardy, vigorous and productive variety. Fruit very large, light red; flesh, yellow, firm, moderately juicy, sweet; quality, very good; mid-season. Tests in Iowa show Red Wing superior to Tonka.

Tonka

A very productive variety. Rated among the best of the Minnesota hybrids. Tree medium in size, vigorous and productive. Fruit medium, light red, large; flesh, yellow, firm, tender, juicy, sweet; good quality; mid-season. An excellent plum in central Iowa.

Underwood

One of the best of all the early plums. The tree is very vigorous, and young trees are productive. The fruit ripens early and extends over a long season, a point of value for home use. Fruit large, round conic; color, rich red; flesh, golden yellow, tender, juicy, sweet and of very good quality. One of the most popular of the hybrids. One of the best for planting in Iowa.

MINNESOTA SAND CHERRY HYBRIDS

Sand cherry hybrids of Minnesota station origin are Nicollet, St. Anthony and Zumbra. These sand cherry hybrids come into bearing at the second or third year after planting. The trees are dwarfish but hardy. The fruit is rather small but desirable for sauce and other culinary purposes. All are self-sterile and should be planted with other sand cherry hybrids to insure cross fertilization of the blossoms. Compass has proved to be one of the best pollenizers for these sand cherry hybrids.

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION HYBRIDS⁷

The Hansen hybrids, originated by Dr. N. E. Hansen of the South Dakota Experiment Station, have been widely planted throughout the Middlewest and are popular because they are productive. They bear well when only a few years of age. Some of these varieties are very well suited to the northern half of Iowa. These varieties in common with most other hybrid sorts should be carefully sprayed for the control of brown rot.

Kahinta

The tree is of Japanese type of growth and foliage. Has done well in northern Iowa. The fruit is large, roundish, dark red, tender, juicy, sweet and very good quality; mid-season. Kahinta is popular, and preferred to Waneta by those who have grown both in Iowa.

Waneta

A sister of Kahinta, popular as a home orchard variety because of its good size and productiveness. The fruit often needs thinning to prevent limb breakage, and to produce large fruit. It must be sprayed thoroughly for control of brown rot. Fruit, large, deep, purplish red, attractive; flesh, tender, somewhat fibrous, sprightly sub-acid, intermingled with sweet; quality is fair; season, August.

Toka, Hanska and Kaga

These are much alike. They are hybrids of the americana plum and the fragrant apricot plum in China. The fruits are much like the Chinese plum in shape, flesh and flavor. Of the three, Toka is the largest and has the record of being the hardiest. Hanska has suffered winter injury at Charles City. The fruit of Toka and Hanska are medium size, flattened at the apex, bright red, firm fleshed, small of pit, and of very good quality. Those who have grown Toka give it strong approval because of its excellent size, quality, and hardness. None of these is as productive as it should be in Iowa.

HANSEN SAND CHERRY HYBRIDS

Opata

Bears very young, very productive; fruit about 1 inch in diameter; roundish; greenish blue color, with greenish colored flesh, sweet, fair quality; ripens in central Iowa during the first 2 weeks of July. Tree is hardy, a stronger grower than Sapa.

(7) Hansen, N. E.—Plant introductions. Bul. 224, S. Dak. Agr. Exp. Sta. 1927.

Sapa

Follows Opata in season; tree hardy, dwarfish, and very productive, bearing fruit at 2 or 3 years of age. The fruit is about an inch in diameter; nearly black with purple flesh, tender, juicy, and good quality; good for canning purposes.

These sand cherry hybrids are particularly desirable in those locations where most other fruits are difficult to grow, but should always be planted in a group with Compass or some of the americana varieties, to provide the necessary cross fertilization of the blossoms.

Oka

Oka is a hardy sand cherry hybrid. The tree is bush-like, and bears fruit the second year after planting. The fruit is round, with black-red flesh, and is recommended as a good substitute for the cherry. Trees of Oka are satisfactory in northern Iowa and bear abundantly.

PART V. CHERRIES

FOR central and southern Iowa no varieties of cherries are better adapted to general culture for the home orchard and for local markets than the well known sour sorts, Early Richmond and Montmorency. The season may be lengthened by the addition of English Morello. As for the sweet varieties, they are, in general, not sufficiently hardy in tree nor fruit bud for Iowa. Of all the varieties now listed by nurserymen for planting in the home orchard in central and southern Iowa, Yellow Glass is the most promising.

Yellow Glass

Imported from Europe by Prof. J. L. Budd of Iowa State College in 1883, this cherry has been propagated and disseminated to many parts of the state. The tree is large with abundant foliage; fruit medium to above in size, roundish, heart-shaped, skin thin, light lemon color; flesh firm, yellow, colorless juice, meaty; quality, good; season about July first. Trees of Yellow Glass are fruiting as far north as Ames but are not regularly productive. The fruit buds are often killed by winter freezing.

Although sweet cherries in general require cross fertilization with other varieties, Yellow Glass seems to set fruit when planted alone. If it requires cross fertilization, it may receive it from sour varieties which are generally present in most orchards.

Early Richmond

Long a standard variety for home use and the general markets. A leading sort for canning. The tree is fairly hardy in southern and central Iowa but rarely does this old variety produce full crops of fruit because of freezing injury of the fruit buds.

The tree grows well, is round headed, dense, needs special training to prevent breakage of large limbs later on. It bears from 4-5 years after planting. The fruit is so well known that it scarcely needs description. It varies in size up to $\frac{3}{4}$ inch in diameter, color light red changing to dark red, flesh pale yellow with light pinkish juice, tender, sprightly sub-acid, quality good. Season early.

English Morello

This is the best late sour cherry grown in America, but is distinctly of less value than either Early Richmond or Montmorency. The fruit is so astringent and tart that it is hardly edible out of hand until fully ripened on the tree. For culinary purposes, it produces a delicious

product, with dark wine colored juice, which has a pleasant, sprightly aromatic flavor.

The tree is dwarfish, drooping in habit, much subject to leaf spot, hardy and fairly productive. Can be grown as far north as central Iowa.

The fruit is about $\frac{3}{4}$ inch in diameter, color deep red to almost black, flesh dark red with an abundance of wine colored juice, tender, tart, good quality and free stone.

Montmorency

This variety is the most popular of all sour cherries for home use, as a commercial fruit on the fresh fruit markets and for canning.

The tree is superior to Early Richmond in vigor, health and productivity. There are a number of strains of Montmorency and recently large fruited sports have been discovered in Michigan.

The fruit matures about a week or 10 days later than Early Richmond and resembles that variety very closely in size, color and flesh characters.